BRUCELLOSIS
(Also known as Bang's Disease, Undulant Fever Malta Fever, and Mediterranean Fever)

✓DISEASE AND EPIDEMIOLOGY

Clinical Description:
Brucellosis is a systemic disease with acute or insidious onset characterized by sustained, intermittent, or irregular fever of variable duration. Symptoms include headache, weakness, chills, profuse sweating, joint aches, depression, weight loss, and generalized aching. Localized and chronic localized infections of organs (including the liver and spleen) can occur. Complications affecting the bones and joints are common (they occur in 20–60% of cases). Involvement of the genitourinary system, including orchitis and epididymitis, (inflammation of the testes and epididymis), occurs in up to 20% of cases in males. Neurologic symptoms can occur in up to 5% of cases. The disease may last for days, months, or occasionally longer, if inadequately treated. Most cases recover, but some individuals develop significant disabilities. Relapses, involving part of or all of the original syndrome, are not uncommon. Asymptomatic infections can occur.

Causative Agent:
Brucellosis is caused by bacteria of the genus *Brucella.* The species of *Brucella* that may infect humans are *B. abortus, B. melitensis, B. suis*, and rarely, *B. canis.*

Differential Diagnosis:
Symptoms are non-specific and diagnosis can be delayed. This disease can be mistaken for other chronic febrile illnesses. Also culture is slow and sensitivity of culture may be low.

Laboratory identification:
Clinicians can send cultures for brucella to most large reference labs. Appropriate specimens include blood (best), CSF, bone marrow, spleen, liver, body fluids and abscess aspirates. Be sure to indicate on the test request slip that brucella is suspected, as different media and/or incubation times will be used. Brucella can also be diagnosed through acute and convalescent serologies.

UPHL: The UPHL will provide confirmation of clinical isolates.

Treatment:
A combination of rifampin (600-900 mg daily) or streptomycin (1 gram daily), and doxycycline (200 mg daily) for at least 6 weeks is the treatment of choice. Trimethoprim-sulfamethoxazole is effective, but relapses are common.

Case fatality:
The case-fatality rate of untreated brucellosis is <2%; however, death may result from endocarditis caused by *B. melitensis.*

Reservoir:
Cattle, swine, goats, and sheep are the most common reservoirs. However, brucellosis eradication programs have greatly reduced the prevalence of the disease in livestock in the U.S. Brucellosis was last identified in cattle in Massachusetts in the mid-1980s. Bison, elk, caribou, and some species of deer may also harbor *Brucella* sp. *B. canis* is an occasional problem in laboratory dog colonies and kennels; a small percentage of pet dogs and a higher proportion of stray dogs have *B. canis* antibody titers, and coyotes have been found to be infected as well.

Transmission:
Brucellosis is spread to humans by direct contact with living or dead infected animals and their carcasses or secretions (including their tissues, blood, urine, vaginal discharges, aborted fetuses, and especially, placentas) Infection is transmitted by inoculation through non-intact skin or through direct contact with mucosal surfaces. It may also be spread through ingestion of raw milk and dairy products (e.g., unpasteurized cheese) from infected animals. Airborne transmission may occur through inhalation of contaminated aerosols (e.g., in laboratory settings). Persons may also be infected through accidental inoculation with live vaccine-strain *Brucella* used for livestock. Person-to-person spread is extremely rare, although it has been reported to occur through bone marrow transplantation.

Susceptibility:
The duration of acquired immunity is uncertain.

Incubation period:
The incubation period for brucellosis is highly variable, ranging from 5–60 days; illness most commonly occurs about 1 month after exposure.

Period of communicability:
Person-to-person transmission of brucellosis is extremely rare.

Epidemiology:
There is worldwide distribution of brucellosis. It is more common in farmers, ranchers, veterinarians, and other people who work directly with animals. It can also be found in people who work in laboratories and slaughterhouses, or as meat inspectors. Sporadic cases and outbreaks may occur among consumers of raw (unpasteurized) milk and milk products, especially soft cheeses. Less than 10% of reported cases occur in children under 19 years of age. Fewer than 120 cases per year are reported in the U.S. Most cases worldwide may be unrecognized and underreported. Confirmed Brucella cases are rare in Utah; the last reported one was in 2004.

✓PUBLIC HEALTH CONTROL MEASURES

Public health responsibility:
- Identify the source of infection and prevent further transmission.

- Rule out the possibility of bioterrorism; brucella is a category B agent.
- Check laboratory workers to assure that there was no exposure to the isolate, or that exposed laboratory personnel are appropriately treated.
- Notify the Department of Food and Agriculture if case was acquired in Utah.

Prevention:

- Do not consume raw milk or milk products (including imported cheese).
- Workers at occupational risk (e.g., farmers, slaughterhouse workers, meat processors, or butchers) should know the symptoms of the disease, the modes of transmission, and the risks of handling infected animal carcasses and products. They should know the proper way to reduce exposure, such as ventilating slaughterhouses and handling carcasses carefully.
- Hunters should use barrier protection (e.g., gloves or clothing) when dressing wild pigs and burying the remains.
- Anyone who handles or disposes of placentas, fetuses, and/or discharges from an animal should use care and should disinfect contaminated areas.
- Local officials and farmers should search for infection among livestock and should eliminate infected animals. In areas of high prevalence, immunization of livestock may be appropriate. Ultimate control of human brucellosis relies on eliminating the disease in domestic animal populations.

Chemoprophylaxis:

None. Exposed laboratory workers should be seen by an infectious disease physician for appropriate antibiotic treatment.

Vaccine:

None.

Isolation and quarantine requirements:

Isolation: None
Hospital: Body substance precautions.
Quarantine: None

✓CASE INVESTIGATION

Reporting:

- Report all suspect and confirmed cases of brucellosis.
- Brucella is a category B BT agent

Brucella (1997)

Clinical description

An illness characterized by acute or insidious onset of fever, night sweats, undue fatigue, anorexia, weight loss, headache, and arthralgia.

Laboratory Criteria for Diagnosis

- Isolation of *Brucella* spp. from a clinical specimen, or
- Fourfold or greater rise in *Brucella* agglutination titer between acute- and convalescent-phase serum specimens obtained greater than or equal to 2 weeks apart and studied at the same laboratory, or
- Demonstration by immunofluorescence of *Brucella* spp. in a clinical specimen

Case classification

Probable: a clinically compatible case that is epidemiologically linked to a confirmed case or that has supportive serology (i.e., *Brucella* agglutination titer of greater than or equal to 160 in one or more serum specimens obtained after onset of symptoms)

Confirmed: a clinically compatible illness that is laboratory confirmed

Case Investigation Process:

- Fill out morbidity form
- Verify case status.
- Fill out disease investigation form.
- Determine whether patient had travel/exposure history consistent with acquisition of disease in Utah or elsewhere.
- If patient acquired disease in Utah, identify the source of transmission and eliminate it.
- The sample must be confirmed by UPHL or the CDC in order to confirm the case.

Outbreaks:

An outbreak will constitute one case of disease without a consistent travel history to indicate infection was obtained in an endemic area such as Central/South America.

Identification of case contacts:

This disease is not spread person-to-person. However, laboratory workers may become exposed during the culture and identification process. Public health should contact the testing laboratory(s) to see whether any personnel were exposed.

Case contact management:

All exposed laboratory workers should be referred to an infectious disease physician for appropriate antibiotic management.

✓REFERENCES

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